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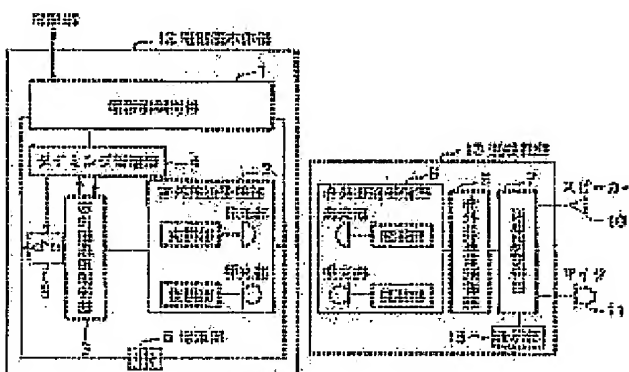
TELEPHONE SET WITH INFRARED-RAY COMMUNICATION FUNCTION**Publication number:** JP11154912 (A)**Publication date:** 1999-06-08**Inventor(s):** YASUZAWA KAZUYA; HAMADA KATSUNORI**Applicant(s):** NIPPON TELEGRAPH & TELEPHONE**Classification:**

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Application number: JP19970318476 19971119**Priority number(s):** JP19970318476 19971119**Abstract of JP 11154912 (A)**

PROBLEM TO BE SOLVED: To reduce the power consumption in an infrared-ray communication equipment. **SOLUTION:** Half-duplex infrared-ray communication is conducted between a portable telephone set main body section 12 and a transmission reception section 13. A primary station starting communication at first stops power supply to the infrared-ray communication equipment from the point of time when the reception of a reception (reply) signal from a secondary station is finished till a point of time when the transmission of a voice or control signal is started next. When the transmission interval and timing of the primary station are constant, the secondary station stops power supply to the infrared-ray communication equipment at the end of transmission of the reply signal, and releases the stop of power supply at a predicted time when the primary station transmits signals.



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CLAIMS

[Claim(s)]

[Claim 1]The 1st infrared transmission and reception section and the 1st infrared-ray-communication control section are provided in a telephone set body part characterized by comprising the following, Provide the 2nd infrared transmission and reception section and the 2nd infrared-ray-communication control section in a transmitter/receiver part, and the above-mentioned 1st and 2nd infrared transmission and reception section performs a half-duplex mutually, An infrared transmission and reception section (it is described as a secondary station below) which received this to a sending signal from an infrared transmission and reception section (it is described as a primary station below) which started the introduction communication certainly transmits a reply signal, Telephone which performs transmission of an audio signal and a control signal by infrared ray communication between the above-mentioned telephone set body part and the above-mentioned transmitter/receiver part with a communication procedure with which the above-mentioned secondary station does not transmit if a signal from the above-mentioned primary station is not received.

A switch which is formed in either the above-mentioned telephone set body part or the above-mentioned transmitter/receiver part, and stops an electric power supply to the infrared-ray-communication transmission and reception section, or is revitalized.

A means to control the above-mentioned switch to stop an electric power supply to the above-mentioned infrared transmission and reception section in a primary station until

the above-mentioned primary station transmits a sound or a control signal next with infrared rays from reception completion of a sound by infrared rays from the above-mentioned secondary station, or a control signal.

[Claim 2]The 1st infrared transmission and reception section and the 1st infrared-ray-communication control section are provided in a telephone set body part characterized by comprising the following, Provide the 2nd infrared transmission and reception section and the 2nd infrared-ray-communication control section in a transmitter/receiver part, and the above-mentioned 1st and 2nd infrared transmission and reception section performs a half-duplex mutually, An infrared transmission and reception section (it is described as a secondary station below) which received this to a sending signal from an infrared transmission and reception section (it is described as a primary station below) which started the introduction communication certainly transmits a reply signal, Telephone which performs transmission of an audio signal and a control signal by infrared ray communication between the above-mentioned telephone set body part and the above-mentioned transmitter/receiver part with a communication procedure in which a transmission interval and air time from a primary station are almost constant respectively.

A switch which is formed in the above-mentioned secondary station, and stops an electric power supply to the infrared-ray-communication transmission and reception section, or is revitalized.

A means by which the above-mentioned secondary station predicts timing which receives a sound or a control signal with infrared rays next from the completion of transmitting of a sound by infrared rays to the above-mentioned primary station, or a control signal, A means to control the above-mentioned switch to stop supply of electric power to an infrared transmission and reception section before receiving timing which predicted [above-mentioned] from the completion of transmitting of an infrared signal of the above-mentioned secondary station, and in the above-mentioned secondary station.

[Claim 3]The telephone with an infrared ray communication function possessing a means to also stop an electric power supply to the above-mentioned infrared control section during an electric power supply pause to the above-mentioned infrared transmission and reception section according to claim 1 or 2.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention has a half duplex infrared ray communication function, and relates to the telephone with an infrared ray communication function which can transmit the sound by infrared rays, or a control signal.

[0002]

[Description of the Prior Art]When a portable telephone is used in automatic in the car in a mobile communication system, By placing a portable telephone on KUREDORU (saucer or placing stand provided near the driver's seat) installed in automatic in the car from the purpose of preventing the traffic accident by the portable telephone use under operation. Via the microphone and speaker which were connected to KUREDORU, it does not have a portable telephone in a hand, but the handsfree device which is that ** can also be talked over the telephone is put in practical use.

[0003]On the other hand, about the portable telephone, connection by a connector with external devices, such as KUREDORU, is abolished, it is considering it as connection by infrared ray communication, and the miniaturization of a portable telephone, simplification of connection with an external instrument, and diversification of the connection device are expected. in this case -- as for infrared ray communication, it is indispensable to have bidirection, a scope like an IrDA (Infrared Data Association) standard is wide, and circuitry is simple -- realization -- an easy method is desired.

[0004]Even if it is a portable telephone which has a connect function by this infrared ray communication, in automatic in the car, connecting with a handsfree device becomes indispensable. Then, utilization of the infrared voice communication of a portable

telephone with an infrared ray communication function and automatic in-the-car installation KUREDORU is proposed. With a portable telephone with an infrared ray communication function, there is also a proposal of also abolishing the electric power supply which passes the connector simultaneously with the conventional connection connector abolition, for long-time-izing of the hour of use of a portable telephone in recent years, and the further miniaturization of a portable telephone. In this case, in a portable telephone, it is necessary to aim at reduction of the power consumption by infrared ray communication.

[0005]It was possible to have stopped low the electric power supply to an infrared light emitting element by setting up infrared-ray-communication distance short in conventional technology. From the purpose of eliminating the special operation for starting/stop of the infrared ray communication function of a portable telephone, in the undiscovered state, a communications partner operates an infrared ray communication function intermittently, and the art of attaining low power consumption also has it. For example, like the sniff mode specified to the IrDA standard, If the art of carrying out fixed time sleep again if fixed time sleep (pause) of the infrared ray communication function is carried out, the signal for discovering a communications partner after that is transmitted and there is no response is applied, low power consumption can be attained always operating an infrared ray communication function.

[0006]

[Problem(s) to be Solved by the Invention]A communications partner can prevent useless power consumption in an undiscovered state by stopping an infrared ray communication function or carrying out communications-partner discovery operation intermittently. However, once it discovers a communications partner and infrared ray communication is started, a method only has shortening a communication range for low power consumption. If he does not transmit after a signal comes from a partner, from a partner, a signal does not come by the infrared ray communication systems based on a half-duplex like an IrDA standard fixed time at least. Time had a margin to the timing which he should transmit, and even if the period which does not transmit at all passed, there was SUBJECT that useless electric power will be supplied in an infrared-ray-communication circuit in the meantime.

[0007]In the state where such SUBJECT is solved, and it turns out that the signal from a partner does not come, and is generous by its transmit timing, an object of this invention is to provide the telephone with an infrared ray communication function which reduces useless power consumption.

[0008]

[Means for Solving the Problem]Telephone with an infrared ray communication function of an invention of claim 1, Are a half-duplex like an IrDA standard and a secondary station certainly transmits a reply signal to a sending signal from a primary station, If a signal from a primary station is not received, based on infrared ray communication systems of not transmitting, a secondary station, With the directions from a transmission and reception section which performs an infrared strange recovery and a light emission and light reception, an infrared-ray-communication control section which performs communications protocol control, the timing Management Department which manages infrared transmission and receiving timing, and the timing Management Department. In [have a switch part which performs cutting and restoration of an electric power supply, and] a primary station after a primary station's receiving a sound or a control signal from a secondary station, Next, the timing Management Department directs to stop an electric power supply to an infrared transmission and reception section to a switch part until timing which transmits is notified by the timing Management Department.

[0009]As for a switch part, in the case of circuitry which can perform independently an electric power supply to a control section and an infrared control section of a telephone set body, an electric power supply to an infrared-ray-communication control section also stops (claim 3). A secondary station that transmit timing from a primary station is constant, transmitting data frame length is constant, and it is in telephone of an invention of claim 2 etc. in the state where the following receiving timing can be expected. In a secondary station, an electric power supply to an infrared transmission and reception section is stopped until a secondary station carries out a receiving start next from from [after transmitting completing to a primary station]. In the case of circuitry which can perform independently an electric power supply to a control section and an infrared control section of a telephone set body, it is also possible for a switch part to also stop an electric power supply to an infrared-ray-communication control section (claim 3).

[0010]Thereby, electric power supplies to an infrared-ray-communication transmission and reception circuit and an infrared-ray-communication control section in non-transmitting and receiving state are reduced, and infrared rays can realize low power consumption telephone with an infrared ray communication function.

[0011]

[Embodiment of the Invention]Drawing 1 is a block lineblock diagram showing a first embodiment of this invention. The telephone with an infrared ray communication function of this embodiment, The electric power supply existence to the telephone

control unit 1, the infrared transmission and reception section 2, the infrared-ray-communication control section 3 that performs protocol control of infrared ray communication, the timing Management Department 4 which manages infrared transmission and receiving timing, the infrared transmission and reception section 2, and the infrared-ray-communication control section 3 to one case. The switch part 5 to change and the telephone set body part 12 which has the power supply section 6 which supplies electric power, It comprises the transmission and reception section 13 which has the indicator 15 which displays the case where it comes out of the transmitting and receiving controller 7, the infrared transmission and reception section 8, the infrared-ray-communication control section 9, the loudspeaker part 10 that outputs a sound, the microphone part 11 which inputs a sound, and service etc. on one case. In half duplex infrared ray communication, the apparatus which started communication first, i.e., the apparatus which received this to the sending signal from a primary station, i.e., a secondary station, certainly transmits a reply signal.

[0012]In the invention of claim 1, if the telephone set body part 12 serves as a primary station, and a primary station carries out reception completion of the signal from the transmitter/receiver part 13 when it is among infrared ray communication, as shown in drawing 4 A, the timing Management Department 4 will open the switch 5 to t_1 at the time. If transmit timing comes at the time t_2 next, the timing Management Department 4 will close the switch 5. As the telephone set body part 12 serves as a secondary station in the invention of claim 2 and it is shown in drawing 4 B, it is the transmit timing t_n from a primary station, and t_{n+1} . -- and transmission interval T_F are almost constant, When the timing Management Department 4 can expect the following receiving timing, the telephone set body part 12 which is a secondary station Transmission to the transmitter/receiver part 13, That is, if a response is completed, the timing Management Department 4 will open the switch part 5 to t_E at the completion time, If the receiving timing Management Department 4 predicts t_s the time of next the sending signal from a primary station (transmitter/receiver part 13) being received from the transmission time of a primary station (transmitter/receiver part 13), and transmission interval T_F and the receiving timing t_s comes, the timing Management Department 4 will close the switch part 5. While the switch part 5 is open, the electric power supply to the infrared transmission and reception section 2 and the infrared control section 3 will be intercepted. The composition which performs processing shown in drawing 4 A and B may be provided simultaneously.

[0013]Drawing 2 is a block lineblock diagram showing a second embodiment of this invention, and has attached identical codes to drawing 1 and a corresponding portion.

This embodiment forms the timing Management Department 4 of a first embodiment, and the switch part 5 in the transmitter/receiver part 13, and attains low power consumption in the transmitter/receiver part 13. Of course, low power consumption may be performed also in the telephone set body part 12 in this case.

[0014]Drawing 3 is the composition when the ability not to intercept the electric power supply to the infrared-ray-communication control sections 3 and 9 in the telephone set body part 12 and the transmitter/receiver part 13, in order that the telephone control unit 1 may serve as infrared-ray-communication protocol control, In - a second embodiment, it differs in that the infrared-ray-communication control sections 3 and 9 are omitted for a start [of this invention]. That is, drawing 1, the electric power supply which referred to 2, and stop control are performed only to the infrared transmission and reception section 2 or/and 8.

[0015]

[Effect of the Invention]As explained above, the telephone with an infrared ray communication function of this invention, The infrared ray communication after being able to apply to the telephone which needs low power consumption like a portable telephone and placing on KUREDORU automatic in the car, Though communication establishment is carried out immediately after arranging to a KUREDORU top and it continues repeating transmission and reception of a control signal periodically even if it does not start at the time of dispatch / arrival generating, low power consumption is realizable. In this case, a voice call can be started without delay at the time of dispatch / arrival generating.

[0016]Are performing that a portable telephone receives the base station electric wave of the service cell periodically, if it comes outside the service area of mobile communications, the display which shows that will be displayed on the indicator 15, but. For this reason, since that cycle fixes transmission of a control signal and it is half duplex infrared ray communication, In order to certainly transmit the response to the control signal from the transmitter/receiver part 13 side, The supply interruption of the electric power to the infrared-ray-communication apparatus from the reception completion of a primary station (in this case, telephone set body part 12) to the following transmit timing, The effect of power-saving is especially acquired effectively to the supply interruption of the electric power to receiving timing with which the next is predicted from sending out of the reply signal in a secondary station (in this case, transmitter/receiver part 13).

[Translation done.]